

REMARKS

The Office Action dated July 18, 2006, has been received and carefully noted. The above amendments and the following remarks are being submitted as a full and complete response thereto.

Claims 1 – 3, 5, 6, 15, 16, 19 – 21, 26, 31, and 32 are being cancelled. Claims 4, 7, 8, 11 – 14, 17, 18, 22 – 25, 27, 29 and 30 are being amended to conform better to United States patent practice. Claims 34 - 36 are being added. Claim 34 is Claims 1, 3, 5, and 6 combined. Claim 35 is Claims 15, 16, 19, 20, and 21 combined. No new matter is being added.

Claims 15, 16, 18 – 26, 28, and 32 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Number 4,763,505 to Klute et al. (hereinafter Klute). The Office Action has taken the position that Klute discloses a conversion means for use in stands of cold rolling tandem mills in which bars 3, 4 with slots 5, 6 engage lugs 9 of cassettes for either four-high or six-high rolling assemblies. Bars 3 and 4 include cylinders 30 and 31 for roll bending and side support. The Office Action has made the assumption of the backup rolls for the six-high mill in Figure 2 and the backup rolls for the four-high mill in Figure 1 are the same backup rolls and that the same force application means are used in both configurations.

Claims 1 – 14, 17, 27, 31, and 33 were rejected under 35 U.S.C. 103 as being unpatentable over Klute taken in view of the admitted prior art. That is, the Office Action would consider it obvious to select roll stand configurations depending upon the characteristics of the product intended to be processed as specifically taught in lines 5 –

12 on page 2 of the specification. Consequently it was considered obvious to optimize the roll stand configurations depending upon what is being produced.

Claims 29 and 30 were rejected under 35 U.S.C. 103 as being unpatentable over Klute taken in view of U.S. Patent 2,601,792 to Dahlstrom (hereinafter Dahlstrom). Dahlstrom shows springs 17 engaged in bracket 16 pressing working rolls against the upper and lower backup rolls. This maintains the work rolls in an open position to permit the insertion of a strip therebetween. The Office Action completely overlooks that the claims require an eight-high configuration. Neither Klute or Dahlstrom teach an eight-high configuration.

These rejections have been rendered moot by the cancellation of independent Claims 1 and 15. It is respectfully submitted that the same rejections are not applicable to newly submitted Claims 34 and 35.

Claim 34 is directed to a method for increasing the range of production of an installation for cold rolling of a strip-shaped product having an ultimate tensile stress ranging from less than 160 MPa to at least 1000 MPa, with the method comprising certain specific steps. The first step is operating at least two rolling stands in tandem for gradually reducing the thickness of product (M), each stand being associated with means for applying a rolling force between two work rolls, allowing, for a given stand configuration, a certain percentage of thickness reduction to be achieved, taking into account the dimensional, mechanical and metallurgical properties of the product, whereby said properties are related to a given production range. The second step is equipping at least one of the stands with means for converting the configuration of the

stand, hence convertible, while keeping the same means for applying the rolling force, in order to have at least three configurations each suited for one production range, including respectively a four-high arrangement comprising two work rolls supported on two back-up rolls, a six-high arrangement comprising two work rolls supported, via two intermediate rolls on the same back-up rolls and an eight-high arrangement comprising two work rolls supported respectively, via a pair of second intermediate rolls, on the same first intermediate rolls and the same back-up rolls, and reversely. The third step is selecting the configuration of at least one of the stands (L1) of the rolling mill for rolling a product depending on the mechanical and metallurgical properties of the product.

Claim 35 is directed to a cold rolling installation, comprising certain specific structure. Means for allowing the product (M) to run through a rolling plane (P) are provided, successively in at least two rolling stands operating in tandem, each stand comprising two housings between which at least four stacked rolls including two back-up rolls and two work rolls respectively, are slidably mounted, in a direction parallel to a roll load plane. Means for applying a rolling force between said rolls with adjustment of respective gaps are provided. At least one convertible stand is provided with at least two possible configurations, while maintaining, for both configurations, at least the same back-up rolls and the same means for applying the rolling force, including respectively a four-high configuration fit for a first production range, with two work rolls and two back-up rolls and a six-high configuration fit for a second production range, with two work rolls, two intermediate rolls and the same back-up rolls and reversely, the work rolls and intermediate rolls being each rotatably mounted on two chocks, each provided with at

least two back-up lugs for means for adjusting the conditions under which the rolling force is transmitted including means for bending the respective rolls. On each side of the rolling plane, the roll bending means are the same in both of the at least two possible configurations and co-operate respectively with back-up lugs of the chocks of work rolls in the four-high configuration and back-up lugs of the chocks of intermediate rolls in the six-high configuration, respectively. The back-up lugs of chocks or work rolls in the four-high configuration are offset with respect to roll axis, on the side opposite the rolling plane (P), and the back-up lugs of chocks of intermediate rolls in a six-high configuration are offset toward the rolling plane (P) with respect to roll axis, so that the back-up lugs of work rolls and of intermediate rolls are arranged substantially at the same level and co-operate with the same adjusting means.

The method and the installation according to the invention make it possible to roll steels with very diverse dimensional, mechanical and metallurgical properties while maintaining sufficient productivity for all steels rates and yet benefiting from all the necessary means of optimally guarantying the required the thickness, flatness, and surface finish of the roll product.

In particular, according to the invention, the production range may include products with a breaking point, i.e. an ultimate tensile stress, ranging from less 160 MPa to at least 1 000 MPa, as indicated on page 7, lines 1-4 of the specification. There is no appreciation or suggestion for the same in the reference relied upon in the prior rejections.

There is no teaching or suggestion in Klute, the admitted art or Dahlstrom of equipping at least one of a set of roll stands with means for converting the configuration of the stand, hence convertible, while keeping the same means for applying the rolling force, in order to have at least three configurations each suited for one production range, including respectively a four-high arrangement comprising two work rolls supported on two back-up rolls, a six-high arrangement comprising two work rolls supported, via two intermediate rolls on the same back-up rolls and an eight-high arrangement comprising two work rolls supported respectively, via a pair of second intermediate rolls, on the same first intermediate rolls and the same back-up rolls, and reversely as claimed in Claim 34.

As explained from page 14, line 34 to page 15, line 30 of the specification, each stand of the rolling mill has to be equipped with means of controlling the product flatness, particularly work roll bending means which usually consist, for each chock, of two cylinder assemblies on each side of the window of the housing in which the chocks are slidably guided.

In Klute'505, the rolling mill comprises bending cylinders 31 for bending the rolls engaging the upper roll-journaling insert bodies (chocks) 8 in the four-high configuration (Fig.1) and 15 in the six-high configuration (Fig.2), and it should be noted that such a disposition provides only :

- a positive bending of the upper roll 11 and a negative bending of the lower roll 12 in the four-high configuration,
- a positive bending of the upper assembly 7, 19 and a negative bending of the lower assembly 18, 20 in the six-high configuration.

In contrast thereto, in the present invention, positive and negative bending may be applied, in the four-high configuration on upper and lower work roll 2, 2' (see Fig. 3) and, in the six-high configuration, on the upper and lower intermediate rolls 32, 32' (see Fig. 4) and this is important for guarantying the thickness and flatness of the product.

To this aim the back-up lugs are offset respectively on the side opposite the rolling plane P for the work-rolls 2, 2' in the four-high configuration and toward the rolling plane P for the intermediate rolls 32, 32' in the six-high configuration. Therefore, the same bending means 5, 5' may be arranged at the same level and may be used in both configurations.

More specifically, there is no teaching or suggestion in Klute, the admitted art, or in Dahlstrom of the structure as claimed in Claim 35 where on each side of the rolling plane, the roll bending means are the same in both of the at least two possible configurations and co-operate respectively with back-up lugs of the chocks of work rolls in the four-high configuration and back-up lugs of the chocks of intermediate rolls in the six-high configuration, respectively. There is no teaching or suggestion of that the back-up lugs of chocks or work rolls in the four-high configuration are offset with respect to roll axis, on the side opposite the rolling plane (P), and the back-up lugs of chocks of intermediate rolls in a six-high configuration are offset toward the rolling plane (P) with respect to roll axis, so that the back-up lugs of work rolls and of intermediate rolls are arranged substantially at the same level and co-operate with the same adjusting means.

Claims 4, 7 – 14, 17, 18, 22 -25, 27 – 30, 33 and 36 contain additional limitations and depend directly or indirectly from either of Claims 34 and 35. These claims are thus allowable for at least the reasons given above.

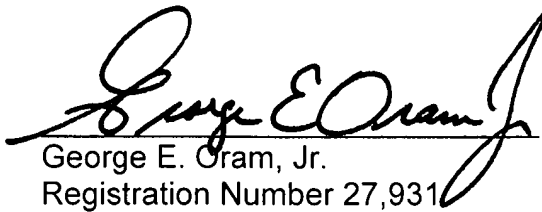
Consequently, certain clear differences exist between the present invention as claimed and the references relied upon by the Office Action. It is submitted that these differences are more than sufficient that the present invention was not anticipated and would not have been obvious to a person of skill in the art viewing those references.

Accordingly, an early Notice of Allowance is respectfully requested.

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event that this paper is not being timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to Counsel's Deposit Account Number 01-2300, referencing Docket Number 103120-00066.

Respectfully submitted,



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